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| 10/572,650            | 12/27/2006  | Nicolai Tarasinski   | 09275W-US           | 4215             |
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| DEERE & COMPANY       |             |                      |                     |                  |
| ONE JOHN DEERE PLACE  |             |                      |                     |                  |
| MOLINE, IL 61265      |             |                      |                     |                  |
| EXAMINER              |             |                      |                     |                  |
| FIORE, LEVON J        |             |                      |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/572,650

**Applicant(s)**

TARASINSKI ET AL.

**Examiner**

LEVON J. FIORE

**Art Unit**

4155

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06/28/2007.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-47 is/are pending in the application.  
4a) Of the above claim(s) 1-24 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 25-47 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 20 March 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities:

Pg 15, paragraph 2, lines 2-4, it is stated that steering member 42 has a steering angle.

Pg 16, paragraph 2, lines 2-3, it is stated that steering member 42 does not have a steering angle.

Appropriate correction is required to make specification consistent and preclude contradicting disclosure.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the reducing gear, as indicated in claim 12 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claims 26-27, 40-47 objected to under 37 CFR 1.75(c), as being of improper dependent, by being dependant on a cancelled claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 25-32, 36-43 and 45-47 rejected under 35 U.S.C. 102(b) as being anticipated by Higasa et al (US 5,465,806).

Regarding claim 25, Higasa discloses a steering system for a utility vehicle, the vehicle having a front axle (Fig 1, 27a), a rear axle (Fig 1, 28a), a pair of front wheels (Fig 1, 2a and 2b), a pair of rear wheels (Fig 1, 3a and 3b), a mechanical drive for driving the rear wheels on the rear axle (Fig 1, 261) and a pair of electric drives (Fig 1, 21a and 21b), each for driving one of the front wheels (Fig 1, 2a and 2b), and a controller for controlling the electric drives and causing each electric drive to transmit a defined torque to a corresponding one of the front wheels (intended use, see description of control mechanism in abstract), wherein when the vehicle is turning, the vehicle having a radial outer front wheel and a radially inner front wheel, the electric drive supplying a greater torque to the outer front wheel and supplying a lesser torque to the inner front wheel (Col 4, lines 38-52).

Regarding claim 26, Higasa discloses a steering system wherein the defined torque is derived from an operating state of the vehicle (Fig 6B, Block K, state derived from wheel rotation sensor) and from an operator input (Fig 6B, Block 35, steering angle input by the operator, by steering the vehicle).

Regarding claim 27, Higasa discloses a steering system wherein the vehicle includes a front axle mechanical steering device (Fig 2, 8), and the operating state comprises a steering angle of the front axle mechanical steering device (Col 1, lines 43-47).

Regarding claim 28, Higas discloses a steering system wherein the steering angle is detected by a sensor (intended use, see description of steering angle sensor in abstract)

Regarding claim 29, Higas discloses a steering system further comprising a yaw rate sensor which senses a yaw rate of the vehicle, and the defined torque is derived from the sensed yaw rate (Col 8, lines 60-66).

Regarding claim 30, Higas discloses a steering system wherein the vehicle includes an input device which can be used by an operator to change a direction of the vehicle (Fig 2, 8).

Regarding claim 31, Higas discloses a steering system wherein the input device comprises a steering wheel (Fig 2, 8), a joystick, a pedal or a switch on a steering wheel of the vehicle.

Regarding claim 32, Higas discloses a steering system wherein the defined torque (Col 7, lines 50-57) is derived from a difference between an actual driving direction (sideways direction due to slipping) and a desired driving direction of the vehicle (direction of desired forward motion maintained by the control system).

Regarding claim 36, Higas discloses a steering system wherein the electric drive comprises an asynchronous electric motor (Fig 11, squirrel cage rotor 77 is evident to asynchronous motor used), and a reducing gear couples the motor to the associated wheel (Col 3, lines 56-61).

Regarding claim 37, Higas discloses a steering system wherein a rotational speed sensor is coupled to each wheel (Col 4, lines 6-10).

Regarding claim 38, Higas discloses a steering system wherein a rotational speed sensor is coupled to the electric drive (Col 4, lines 6-10).

Regarding claim 39, Higas discloses a steering system wherein the defined torque is computed as a function of the rotational speeds of the wheels (intended use, see description of wheel rotation sensor in abstract).

Regarding claim 40, Higas discloses a steering system wherein torque transmitted by the electric drive is computed as a function of a difference between a mean value of peripheral speeds of the rear wheels and the peripheral speed of the driven front wheel (Col 8, lines 48-55).

Regarding claim 41, Higas discloses a steering system wherein the torque transmitted to the wheel driven by an electric drive is limited when a threshold rotational speed of the wheel driven by the electric drive has been exceeded (Col 7, lines 44-50).

Regarding claim 42, Higas discloses a steering system (Col 7, lines 30-43) wherein the steering system prevents varying the defined torque (torque applied to the wheel) until a defined value of a vehicle operating state has been exceeded (value of positive traction condition, received by sensor input, depending on road condition).

Regarding claim 43, Higas discloses a steering system (Col 4, lines 38-52), wherein the electric drives are controlled in a non linear fashion to optimize tire wear during large radius (limited tire wear is a by product of differential action produced by varying torque input on inside and outside wheels of a turn) turns and to minimize turning radius during small radius turns (minimizing turning radius is a by product of differential action produced by varying torque input on inside and outside wheels of a turn).

Regarding claim 45, Higas discloses a steering system wherein the vehicle can be steered by causing the electric drives to transmit differing torques to each of the front wheels (Col 4, lines 38-52).



Regarding claim 46, Higas discloses a steering system wherein the electric drives are controlled to counter steer the vehicle when moving across a slope (Fig 13b, counter steering action is shown, thus will also occur if vehicle is also driven across a slope).

Regarding claim 47, Higas discloses steering system wherein the electric drives are controlled to stabilize the vehicle (Col 7, lines 50-57).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 44 rejected under 35 U.S.C. 103(a) as being unpatentable over Higasa et al (US 5,465,806).

A steering system comprising a differential lock which allows the front wheels to be driven at equal peripheral speeds is well known in the art (See, for example, GM's "Gov-Lok" locking differential steering system widely used on 1983 Silverado models).

It would be obvious to one skilled in the art to use a locking differential in combination with the steering system, because such differential provides greater traction on slippery surface by enabling both axial wheels to be simultaneously driven.

Motivation for using locking differential in combination with a steering system, would be to allow user to travel through mud or snow by obtaining greater traction.

8. Claims 33-35 rejected under 35 U.S.C. 103(a) as being unpatentable over Higasa et al (US 5,465,806) in view of Henderson (US 5,764,511).

Regarding claim 33, Higasa discloses vehicle having a steering system.

Higasa does not disclose a steering system wherein the desired driving direction of the vehicle is derived from a defined travel route stored in a memory unit.

Henderson discloses a vehicle wherein the desired driving direction is derived from a defined travel route stored in a memory unit (Col 7, lines 11-19).

It would be obvious to one skilled in the art to use a remote control navigation system outlined in Henderson in combination with a vehicle outlined in Higasa, because it will allow the operation of said vehicle remotely and automatically, thus eliminating a need for an operator and driving the vehicle unmanned on a dangerous terrain.

The motivation for using a remote controlled navigation system on a vehicle is to increase productivity, and preserve human well being by not subjecting the operator to driving the vehicle on compromising terrain.

Regarding claim 34, discloses vehicle having a steering system.

Higas does not disclose a steering system wherein a navigation system includes a remote transmitter which transmits navigation signals, and the desired driving direction is derived from the navigation signals.

Henderson discloses a vehicle wherein a navigation system includes a remote transmitter which transmits navigation signals, and the desired driving direction is derived from the navigation signals (intended use, see description of navigation system in abstract).

It would be obvious to one skilled in the art to use a remote control navigation system outlined in Henderson in combination with a vehicle outlined in Higas, because it will allow the operation of said vehicle remotely and automatically, thus eliminating a need for an operator and driving the vehicle unmanned on a dangerous terrain.

The motivation for using a remote controlled navigation system on a vehicle is to increase productivity, and preserve human well being by not subjecting the operator to driving the vehicle on compromising terrain.

Regarding claim 35, discloses vehicle having a steering system.

Higas does not disclose a steering system wherein a remote control system which includes a transmitter and a receiver on the vehicle, the remote control system allowing the vehicle to be controlled remotely.

Henderson discloses a steering system wherein a remote control system which includes a transmitter and a receiver on the vehicle, the remote control system allowing

the vehicle to be controlled remotely (intended use, see description of navigation system in abstract).

It would be obvious to one skilled in the art to use a remote control navigation system outlined in Henderson in combination with a vehicle outlined in Higas, because it will allow the operation of said vehicle remotely and automatically, thus eliminating a need for an operator and driving the vehicle unmanned on a dangerous terrain.

The motivation for using a remote controlled navigation system on a vehicle is to increase productivity, and preserve human well being by not subjecting the operator to driving the vehicle on compromising terrain.

#### **Pertinent Prior Art**

The following section outlines references comprising features pertaining to applicant's disclosure, but not necessarily indicated in the claims.

Nakakita et al (US 6,386,305) discloses a control system that implements turning via controlling amount of torque supplied to each wheel.

Ando et al (US 5,388,658) discloses a yaw control system.

Kjaer et al (US 6,422,333) discloses a system adapted to control the stability of a vehicle on an inclined surface.

Matsuno et al (US 5,850,616) discloses a control algorithm adapted to vary the power of the engine via various sensor inputs.

Arai (US 5, 839,535) discloses a vehicle drive train comprising of two different types of motors adapted to drive alternate sets of wheels.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEVON J. FIORE whose telephone number is (571)270-7020. The examiner can normally be reached on Monday to Thursday, 0730 to 1700 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thu Nguyen can be reached on 571-270-6967. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LEVON J FIORE/  
Examiner, Art Unit 4155

9/11/2008

/Thu Nguyen/  
Supervisory Patent Examiner, Art Unit 4155